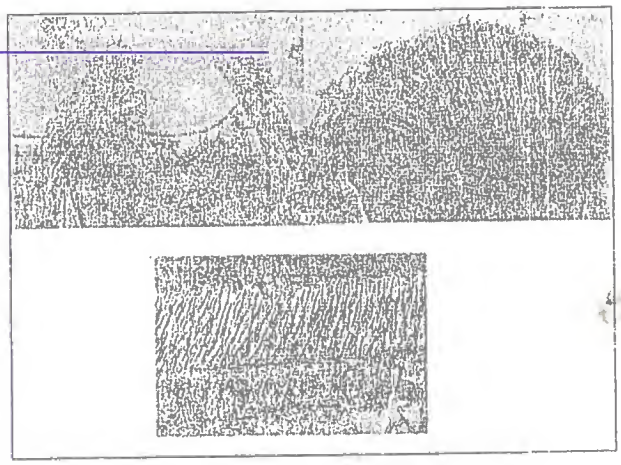
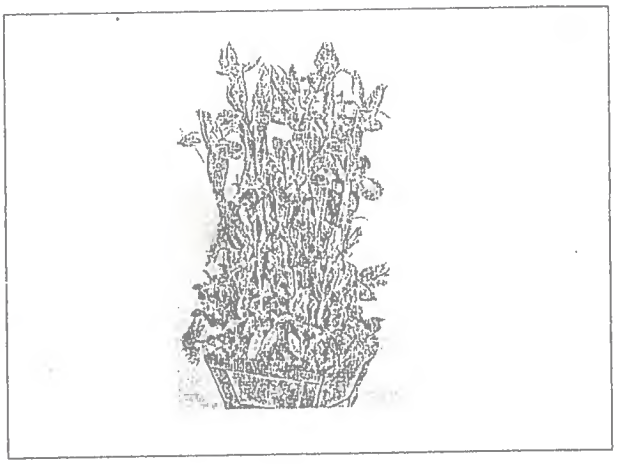
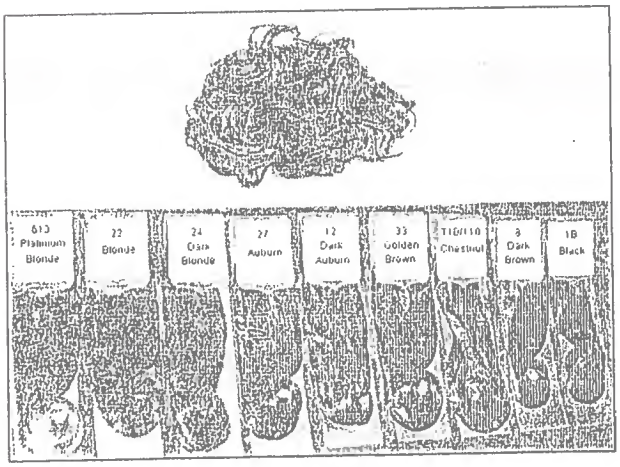




Wigs, Hair pieces & Camouflages

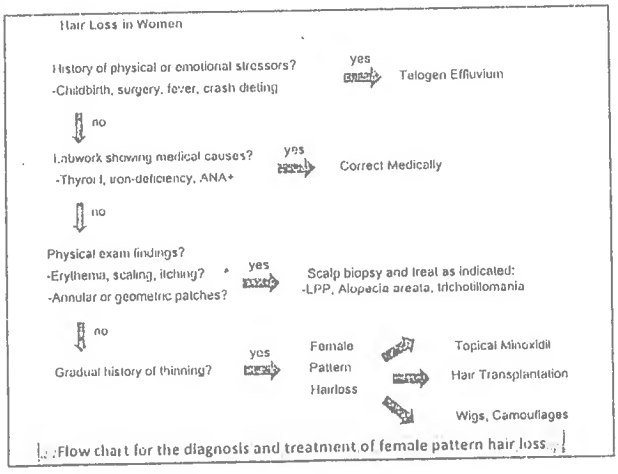
- Useful for patients who can not achieve sufficient hair density with medications and / or surgery.
- No medical side effects.
- Patients can freely change their hair style.
- Use of natural or synthetic hair fibers.
- Camouflage the areas of thinning scalp by various topical sprays or powders.



Conclusion

- Patients frequently feel confused with the multiple options for treating hair loss.
- Dermatologists can help them to choose the best option for them.
- MINX & finastride remain the best agent in treatment of hair loss, the most effective in clinical practice & supported by literature, at least 6 – month ovelap.

- No guarantee that patients will not experience a telogen eff. when switching from one treatment to another.
- Treatment of male and female pattern hair loss is different.
- Diagnosis in male is straightforward.
- Diagnosis in females require considerable history and physical exam.



Flow chart for the diagnosis and treatment of female pattern hair loss

Anagen Effluvium

By
Ahmed Sadek
Professor of Dermatology
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Three phases of growth cycle

Anagen phase

- Growing phase
- Vigorous mitotic activity(matrix cells)
- Have long indented roots
- Intact sheaths
- Fully pigmented , at the end of the phase pigment decreases
- 1000 days

Catagen phase

- Transitional phase
- Mitotic activity decreases
- The follicle separates from the dermal papilla & capillary plexus
- Moves upward within its sheath
- Few days

Telogen phase:-

- Resting phase
- Club hairs (short , club shaped roots)
- Lack root sheaths
- Depigmentation of the proximal part of the shaft
- 100 days
- 10-15%

الشعر لتقع ... حاج تتزس

Dystrophic anagen

- State in which anagen phase become inflamed and unable to produce hair fibre of significant size or integrity

Nanogen follicles

- Intermediate stage between terminal & vallus anagen

Exogen

- Hair cycle event describes the controlled shedding club hair fibres

Kenogen

- A state in alopecias in which exogen occurs before renewed anagen growth, leaving a hair follicle without visible hair fibre

Anagen effluvium

- Diffuse hair loss in which the hairs shed in the anagen phase
- Types of anagen effluvium

1)Loose anagen hair
2)Dystrophic anagen effluvium

Loose Anagen Hair Syndrome

- A disorder of anagen hair anchorage to hair follicle, with ability to easily & painlessly pull out large number of anagen hairs from the scalp
- First described in 1986
- Occurs more in fair-haired girls, 2-9 years
- Autosomal dominant

Clinically

- Predominantly described in children
- Often recedes with age
- Can be seen in adulthood
  - -Continuation of the disorder
  - -Late onset anagen hair syndrome
  - -Similar changes associated with AIDS (AIDS trichopathy)
- Variation in hair texture, dry, lusterless, with uneven ends, diffuse thinning, focal areas of alopecia

cuticle of IRS

Pathogenesis

- Disturbance of cellular adhesion between the hair cuticle and IRS
- Aberrent keratinization of IRS
- Traction separates the hair from IRS
- IRS remains attached to the follicle

H/P study

- Abnormal clefting between IRS & hair shaft
- Premature keratinization & degeneration of IRS
- Poor cohesion of the cells of ORS
- Ultrastructural study show longtidunal grooves of hair shaft

DD

- Alopecia areata
- Telogen effluvium
- Pili torti
- Uncombable hair syndrome

Management

- Reassurance , improves in mid to late teens
- Look out for associated features like hypohiderotic ectodermal dysplasia

Dystrophic Anagen Effluvium

- Shedding of large number of hairs from the anagen phase of growth.

Aetiology:-

Antineoplastic drugs (chemotherapy induced alopecia CIA)

- -Busulphan (most common implicated agent)
- -Cyclophosphamide
- -Thiotepa
- -Melphalan
- -Etoposide
- -Carboplatin
- -Docetaxel
- -Paclitaxel

- Radiation induced alopecia
- Environmental or occupational exposure to toxin (toxic alopecia)
- Alopecia areata (inflammatory insult to the matrix)
- Uncommon symptom of pemphigus vulgaris , due to auto Ab to desmosomal ptn. in follicular epith. , cleavage causes AE in lesional & perilesional areas.

Radiation induced Alopecia

- Reversible or permanent.
- Permanent alopecia occurs with > 30 GY of deep X-rays or >50 GY of soft X-rays
- Radiation –induced temporary epilation may follow neuroradiologically guided embolization procedures.

Toxic Alopecia

- Exposure to hazardous chemicals , toxic metals of the environment .
- Many heavy metals (Thalium , mercury , arsenic , copper , cadmium , bismith) disrupt the formation of hair shaft through binding to sulfhydryl groups of keratin .
- Copper intoxication may be related to ingestion of tap water containing a high conc. Of copper salts.
- Dental amalgam (mercury)

Chemotherapy induced Alopecia (CIA)

- The morbidity of CIA should not be underestimated .
- Usually reversible , permanent alopecia is rare.

Pathophysiology:-

- Chemotherapy targets replicating cells within hair matrix (high mitotic & metabolic activity)
- Inhibition or arrest of cell division lead to a narrow weakened segment of hair shaft.
- Susceptible to fracture with minimal trauma.
- Can result in complete failure of hair formation.
- High dose or repeated chemotherapy could induce telogen eff. Beside AE with delay in hair regrowth.
- More common and severe with combination therapy.
- Severity also depends on route , dose , frequency & individual variation for the bioavailability of the drug.

Clinically

- History of exposure to drugs
- Hair loss usually begins 7-14 days after , most apparent after 1-2 months .
- Grading of hair loss (WHO criteria)
  - -Grade 0 = no loss
  - -Grade 1 = mild hair loss
  - -Grade 2 = pronounced or complete

Examination revealed:-

- Non scarring alopecia with intact follic. Ostia.
- No signs of inflammation
- Affects the scalp (more on the crown) ,eye brows , eye lashes and body hair.

Differential Diagnosis.

- Telogen eff.
- Androg.Alopecia
- Traction alopecia
- Trichotillomania
- Alopecia areata
- Alopecia mucinosa
- Tinea capitis
- Atopic D
- Pemphigus vulgaris
- Psoriasis

Other problems to be considered

- Hypo & hyperthyroidism
- Hypopituitarism
- Diabetes
- Sezary syndrome
- Lymphoma
- Ptn.malnutrition
- Iron deficiency
- Collagen disease
- Endocrine and metabolic disorders
- Syphilis
- Wide spread skin diseases

Pull test

- By firm grasping of about 40 hairs between thumb & forefinger and slowly pull on them.
- Presence of tapered fractures of the shaft is diagnostic of AE.

Histologic changes

- Horizontal sections
- 4 mm punch biopsy contains 25-50 follicles
- Normally < 15 % of the follicles are in telogen phase.
- Normal Anagen to telogen ratio is characteristic of AE.
- No signs of inflammation.

Treatment.

- Minoxidil shortens the period of baldness by about 50 days.
- Scalp cooling with cold air or liquid.
- Application of a pressure cuff around the scalp and local hypothermia
  - Hinder the delivery of medication to the scalp.
  - Not suitable in patients with leukemia , lymphoma and other hematologic malignancy

- Medical corrective preparation makeup to camouflage eye brow alopecia
- In rodent models , localized administration of heat or subcut./intradermal injection of geldanamycin induced stress ptn. response in hair follicles & prevented CIA

Prognosis

- Reversible with hair regrowth after 3-6 months.
- Permanent alopecia is rare with CIA.
- In some cases , hair regrows despite continued or maintenance therapy.
- Occasionally , colour & texture of regrowed hair after chemotherapy is different. .

Patient education.

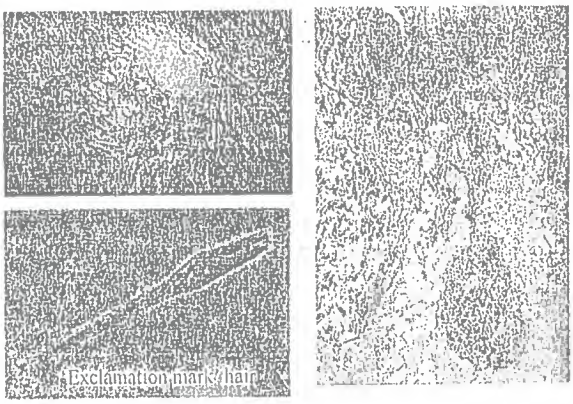
- CIA can be psychologically devastating to the patient.
- Patients have even refused life-saving treatment.
- Other medications can cause AE.
- Reassured that hair loss is temporary.

Permanent CIA

- Absence or incomplete hair regrowth 6 months after completion of chemotherapy.
- Irreversible , non scarring
- Rare
- First described in 1991 following chemotherapy & subsequent bone marrow transplantation (BMT)
- BMT usually indicated in hematological malignancies.
- Few reports of CIA without bone marrow transplantation
- Incidence 0.9 – 43 %

Described following therapy with:-

- Busulphan
- Cyclophosphamide
- Thiotepa
- Melphalan
- Etoposide
- Carboplatin
- Docetaxel
- Paclitaxel

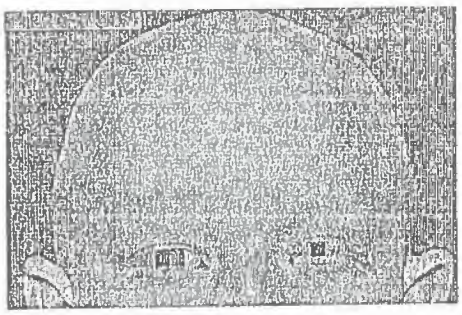


Hair transplantation

- Useful adjunct to hair transplant surgery for AGA.
- Perioperative, prevent the usual shedding (1 – 2 weeks) & speed the time for regrowth from 6 -8 months to 1-2.
- Used for 6 w before & 17 w after.
- Should be stopped 2 – 3 days before surgery to minimize irritation and risk of bleeding.
- Restart again 1 – 2 w after surgery.
- Better efficacy with 5% concentration.

Chemotherapy-induced alopecia

- A randomized, double blind study of breast cancer patients using 2%.
- Used during the course and 4 months post chemotherapy.
- 50% decrease in Alopecia.



Telogen Effluvium

By

Ahmed Sadek

Professor of Dermatology & Venereology

- Syn. Telogen defluvium
- First coined by Kligman in 1961
  - Loss of club hair in disease states of the follicle
- Type of diffuse hair shedding associated with diffuse alopecia
- Other causes include ; anagen eff. and early AGA

Normal hair cycling

- Follicular cycling within anatomical region is synchronous in infancy producing moult wave
- Moult wave persists in many animals
- In human synchronous hair growth disappears in childhood
- Scalp hair growth is cyclical in manner
- Each hair follicle undergoing 10-30 cycles in a life time

- Anagen (growth phase) 2-8 ys
- Catagen (involution phase) 2-3 weeks
- Telogen (resisting phase) 2-3 months
- Exogen (release of the dead hair) may coincide with the end of telogen , club hair released 4-6 weeks after the onset of anagen
- 100,000 hairs on the scalp
- Normally 10-15% are in telogen
- Shedding of 100-150 telogen hairs/day is normal
- Anagen hair loss is never normal

Pathogenesis

- Headington (1993) described 5 functional types of TE based on different phases of follicular cycle

1)Immediate anagen release

2)Delayed anagen release

3)Short anagen syndrome

4)Immediate telogen release

5)Delayed telogen release

Immediate anagen release

- Short onset effluvium
- Follicles are stimulated to leave anagen and enter telogen prematurely
- Increased hair shedding at the end of telogen
- Common with severe illness and drug induced hair loss

Delayed anagen release

- The cause of post partum hair loss
- During pregnancy , hairs remain in prolonged anagen
- Post partum telogen conversion leads to increased shedding some months later

Short anagen syndrome

- Idiopathic shortening of the duration of anagen
- Can cause a persistent TE in some individuals

Immediate telogen release

- Results from shortening of normal telogen
- Release of club hairs as the follicles are stimulated to re-enter anagen
- Drugs(minoxidil) can precipitate immediate telogen release

Delayed telogen release

- Occurs after prolonged telogen followed by transition to anagen
- Occurs in animals with synchronous hair cycles during shedding of their winter coats
- May occur seasonlly in some humans

- **TE can be divided into :-**
  - **Acute**
  - **Chronic**
  - **Chronic – repetitive**

Acute TE

- Acute onset
- Less than 4-6 months
- Triggers such as high fever , surgical trauma , sudden starvation or haemorrhage
- 33% no identified trigger
- Evidence for emotional stress as a cause is weak

- Pathogenesis : immediate anagen release
- Unless the trigger is repeated , spontaneous complete regrowth within 3-6 months
- The degree of hair loss depends on the duration and severity of the course in addition to individual variation in susceptibility

- Most cases of telogen gravidarum resolve , small proportion experience persistent episodic shedding that may be diffuse or localized
- Similar state occurs after discontinuation of contraceptive pill
- Telogen gravidarum is an example of delayed anagen release

Chronic TE

- Insidious onset
- Due to prolonged or repeated insult
- Hair shedding persist for more than 4-6 months
- Chronic TE can be primary or secondary

- To be a true cause , the relationship between the trigger and hair loss must be reversible & reproducible
- Examples include :- thyroid disorders , iron deficiency anaemia , malnutrition & acrod. enteropathica

Triggers of TE

Hormones

- Discontinuation of oral contraceptives
- Taking oral contraceptives with androgenic progesterones
- Replacement therapy with high dose progesterones
- Chronic TE with prolonged breast feeding associated with decreased estrogen , increase in prolactin level

Thyroid

- 50% with hyperthyroidism
- 33% with hypothyroidism
- The mechanism is unclear
- Reversible when euthyroid states is restored
- Long standing hypothyroidism , the hair follicles may be atrophied

Nutritional influences

- Nutritional deficiencies may be due to diseases , prolonged breast feeding , parentral alimentation , vegeterian diets , healthy diets
- Iron storage anemia
- Caloric deprivation (starvation diets)
- Rapid wt. loss
- Vitamins , minerals and protein deficiencies
- TE occurs 4-6 months after initiation of such diet

Anaemia

- Iron deficiency is the world's most common nutritional deficiency
- Hb concentration is a screen for iron deficiency
- Ferritin used to confirm iron storage deficiency

- TE, diffuse pattern hair loss & alopecia areata can be related to iron & iron storage deficiencies
- Iron supplements & iron containing foods is helpful adjuvant therapy
- With iron supplements , monitoring iron initially every 6-8 weeks then every 6 months

- Upper limit for iron intake for 18 ys & older is 45 mg/d
- Major side effect of iron overload
  - *Tissue damage & fibrosis*
  - *Exacerbate hemochromatosis*

Zinc deficiency

- Can present as alopecia and TE
- Can be acquired or hereditary
- Excessive iron supplementation and vit A deficiency can cause zinc deficiency
- Low serum zinc level
- Zinc supplementation is the therapy of choice

- Above normal value of zinc can result in copper, iron & calcium deficiencies , GIT reactions , headache & drowsiness
- Oral zinc supplement has also antiinflammatory effect , assist iron absorption and antiandrogen

- Daily requirement
  - *5-8 mg/day for children*
  - *15mg/day for adult*
- In zinc deficiency
  - *0.5-1 mg of elemental zinc /kg/day for infants & children*
  - *25-50 mg/day of elemental zinc for adult*

Vitamin A & TE

- Plays an important role in cell maturation and differentiation and the immune system
- Deficiency & hypervitaminosis A can lead to TE
- Provitamin A & cartinoids are safe
- Upper limit for tolerable intake
  - *Less than 2000 IU/day for children*
  - *Less than 10,000 IU/day for adult,pregnant and lactating females*

Biotin deficiency & TE

- Essential vit. That complements nail & hair growth
- Deficiency can lead to alopecia , dermatitis , neurological disorders & recurrent infections
- Recommended daily dose
  - *0.05-0.3 mg/day for infants & children*
  - *0.3 mg/day for adults and lactating females*
  - *In biotin defiecient adults , 1-5 mg/day*

Vit D & TE

- Vit D deficiency can induce follicular cycling alteration in mice and animal models
- Vit D3 supplements initiate hair follicle cycling and stimulate hair growth in mice
- Vit D3 supplementation could be a supportive adjunctive therapy in TE

- Topical calcipotriol has no effect on TE
- Recommended daily allowance
  - *400 IU/day for children , adults and pregnant females*

Protein and restricted calories and TE

- Induced TE and alopecia
- Later lead to diminshed size and density of hair follicles and reduced hair diameter
- Chronic deficiencies result in sparse , fragile , fine & light colored short hair
- Protein supplements and supportive calories will improve quality of hair and promote growth

Fatty acids & TE

- Lead to skin & hair changes
- Dry , fragile & light colored hair and TE
- Can be associated with dermatitis especially of the scalp & eye brows
- Supplements reversed TE

Systemic disorders and TE

- Autoimmune diseases
- Acute and chronic systemic infections
- Inflammatory bowel disease
- GIT disorders
- Febrile episodes
- Acute and chronic illness
- Lymphoproliferative disorders

Surgery and TE

- The etiology of postoperative TE is multifactorial and includes
  - *Surgery procedure*
  - *Surgical events*
  - *Drugs*
  - *Hypotension*
  - *Metabolic stress*

Drugs – botanical supplements and TE

- Many drugs and fewer herbals – supplements can induce TE & alopecia
- Careful histories about drugs is important in patient with TE
- If the initiating drug is discontinued a reversal of TE is expected

- Examples of drugs that can induce TE & alopecia
  - *Androgens*
  - *Anticoagulants*
  - *Anticonvulsants (altered or reduced zinc & selenium)*
  - *Antidepressants*
  - *Antifungal such as ketoconazole & fluconazole in high doses*
  - *Antiinflammatory drugs (prolonged use of NSAIDS)*

- *Antimitotic drugs used in cancer or as a immunosuppressive in high dose induce anagen effluvium & in low dose induce TE*
- *Angiotensin converting enzyme inhibitors (binding of zinc) and reversible with zinc supplement*
- *B-blockers*
- *Estrogen antagonists (inhibit estrogen action on dermal papilla)*
- *Heavy metals*
- *Hypervitaminosis A*

- *Topical minoxidil can initiate TE which resolve in several months*
- *Statin which reduce cholesterol*
- *Sulfasalazine*

Scalp inflammation & TE

- Seborrheic dermatitis , ps. and contact dermatitis of the scalp induced TE , trichodystrophies and follicular miniaturization
- Severity of seb.D correlates with severity of TE

- Antidandruff shampoos represents the most common therapeutic agents
- Ketoconazole and zinc pyrithione can partially reverse TE and enhance hair growth
- Other effective therapies
  - *Pimecrolimus 1% cream*
  - *Oral fluconazole 50 mg /day /2 weeks*
  - *Oral terbinafine 250 mg/day/6weeks*

Diagnosis

1) History

- Duration of hair shedding
- Episodic or continous
- .Estimation of % of hair lost
- Identification of triggers
- History of recent surgery , fever , illness , child birth & psychological stress
- History of chronic disease , malignancy , infection , autoimmune disease , liver & renal diseases

- Menstrual history
- Hair care procedures
- Dietary history and wt loss noted
- Family history of autoimmune disease and thyroid disorders
- Medication including over-the-counter drugs and botanicals
- History of heavy metal exposure

2)Examination

- Inspection: visual , wood's light or by dermoscopy or videodermoscopy
- Inflammation , erythema and scaling , infection
- Hair collection , hair pull , hair clipping , hair pluck

- Nail examination
- Scalp biopsy :-
  - *Increase the proportion of follicles in telogen*
  - *Anagen : telogen ratio 8 : 1 (normal 14:1)*
  - *Terminal to vellus hair as in normal (8:1)*
  - *In androgen.A (1.9:1)*

3)laboratory workup

- CBC
- CMP
- Serum ferritin level
- TSH ,T4 , microsomal Ab
- Serum zinc level
- Serum vit.D 25 hydoxylase

Treatment

- Education and explanation to the patient their condition
- Remove the trigger and treat it (shedding will settles , but can continue for up to 6 months)
- In acute TE , if the trigger is removed , the shedding is short lived and no further treatment is required

- Treat scalp inflammation and diseases
- Replace nutritional deficiency
- Treat thyroid disease if present

- Treat underlying systemic illness or infection
- Biotin and zinc replacement can support hair regrowth
- Topical hair growth promotor , minoxidil 2% or 5%